September 19, 2003

Rick Olsen, General Manager
Canyon Fuel Company, LLC
P.O. Box 1029
Wellington, Utah 84542

Re: Final Approval of Methane Degas Wells G-1, G-2, G-3, Canyon Fuel Company, LLC., Dugout Canyon Mine, C/007/039, Task ID#1642, Outgoing File

Dear Mr. Olsen:

The above-referenced amendment to permit the potential drilling of one to three methane degasification boreholes at the Dugout Canyon Mine is approved. A copy of our Technical Analysis is enclosed.

If you have any questions, please call me at (801) 538-5268 or Pete Hess at (435) 613-5622.

Sincerely,

Pamela Grubaugh-Littig
Permit Supervisor

sd
Enclosure
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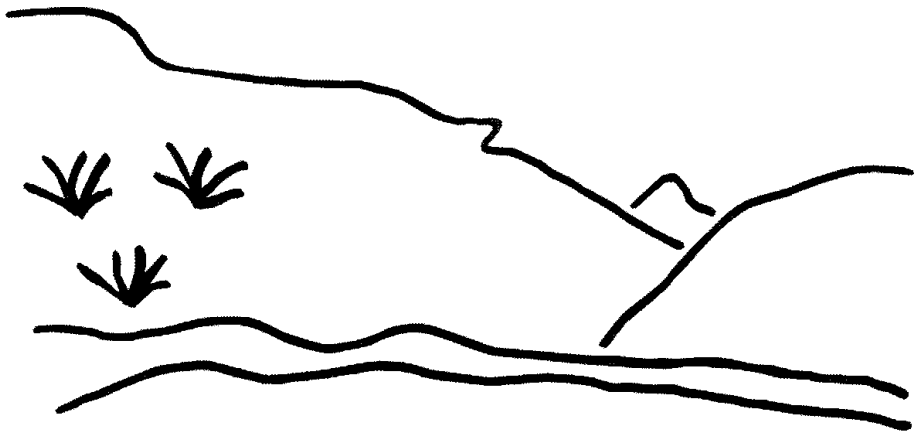
State of Utah



Utah Oil Gas and Mining

Coal Regulatory Program

Dugout Canyon Mine
Methane Degasification Wells G-1, G-2, G-3
C/007/039
Task ID #1642
Technical Analysis
September 15, 2003

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TECHNICAL ANALYSIS

The Division regulates the Surface Mining Control and Reclamation Act of 1977 (SMCRA). When mines submit a Permit Application Package or an amendment to their Mining and Reclamation Plan, the Division reviews the proposal for conformance to the R645-Coal Mining Rules. This Technical Analysis is such a review. Regardless of these analyses, the permittee must comply with the minimum regulatory requirements as established by SMCRA.

Readers of this document must be aware that the regulatory requirements are included by reference. A complete and current copy of these regulations and a copy of the Technical Analysis and Findings Review Guide can be found at http://ogm.utah.gov/coal

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

Often the first technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

INTRODUCTION

The permittee submitted a proposal to the Division on August 1, 2003 to permit the potential drilling of one to three methane degasification boreholes at the Dugout Canyon Mine. The purpose of the holes is to enhance the coal extraction process from the longwall panel located in Section 24 of Township 13 South Range 12 East and Section 19 of Township 13 South Range 13 East. The wells will provide additional venting/dilution potential for the Mine's ventilation system. The permittee's intent is to drill hole G-3 first, and then proceed, if needed for additional venting capability, with the drilling of G-2 and G-1.

All surface lands are leased by the permittee from the Milton and Ardith Thayn Trust. Coal ownership is under the U.S. Department of the Interior, Bureau of Land Management in Section 24. The coal ownership in Section 19 is under the BLM and the State of Utah, School and Institutional Trust Lands Administration.

The permittee submitted additional and/or revised information on August 28th, September 4th, and September 10th in order to address concerns aired by various disciplines. As such, the finalization of all technical analyses was suspended in order to expedite the permitting process. This TA is the only document prepared, prior to the recommendation for approval.

INTRODUCTION

GENERAL CONTENTS

IDENTIFICATION OF INTERESTS

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

Analysis:

The Identification of Interest information is in the Mining and Reclamation Plan, Chapter 1, page 1-2. This information was revised in January of 2000. The information has not changed.

The corporate officers have not changed.

All surface ownership in Sections 24 and 19 relative to the three proposed well locations is held by the heirs of the Milton and Ardith Thayn Trust.

A review of Plate 1-2, as contained in the approved mining and reclamation plan for the Dugout Canyon Mine, indicates that all coal ownership in Section 24 is by the United States of America (USA). Coal ownership in Section 19 is held by the USA as well as the State of Utah. All coal located beneath the proposed locations for wells G-3, G-2, and G-1 is Federal coal.

The wells are located within the currently approved mine permit area. The owners of record for surface and mineral properties contiguous to the proposed permit area are the USA, Department of the Interior, Bureau of Land management, and the State of Utah, School and Institutional Trust Lands Administration, (See **Chapter 1**, page **1-4,** section **112.600**).

The U.S. Department of Labor, Mine Safety and Health Administration has issued three identification numbers relative to the Dugout Canyon Mine; these are:

1) MSHA No. 42-01890 for the Gilson seam on the west side of the Canyon,
2) MSHA No. 42-01888 for the Gilson seam on the west side of the Canyon, and
3) MSHA No. 1211-UT-09-01890-01 Dugout Canyon Mine Refuse Pile.

All are contained in **Chapter 1**, page **1-19**, Section **112.700 MSHA Numbers** of the approved mining and reclamation plan.

Chapter 1, page **1-4**, section **112.800 Interest in Contiguous Lands** of the methane well submittal indicates that Canyon Fuel Company, LLC has no interest in contiguous lands other than those currently owned as shown on Plate 1-1 of the approved M&RP.

Findings:

The submitted information meets the minimum regulatory requirements of this section.

VIOLATION INFORMATION

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

Analysis:

The permittee submitted new corporate violation information to address the requirements of this section on September 10, 2003. The new information has been submitted for incorporation into the Dugout Canyon Mine mining and reclamation plan, upon approval of the degasification well amendment. The required information is contained in Chapter 1, pages 1-21, 1-22, and 1-23A-R. The information was previously updated in January of 2003.

The newly submitted information contains the violation information for all of the ARCH Coal, Incorporated operations. All corporate violations that are pending exist at ARCH operations in the States of West Virginia or Virginia. There are no outstanding violations relative to ARCH's Canyon Fuel Company operations in the State of Utah.

Findings:

The submitted information meets the minimum regulatory requirements.

RIGHT OF ENTRY

Regulatory Reference: 30 CFR 778.15; R645-301-114

Analysis:

The permittee has included, as part of the application (**ATTACHMENT 4-2**), the surface landowners agreement between the heirs of the Milton and Ardith Thayn Trust and the permittee. Based on a review of **EXHIBIT "A" to Surface Use Agreement, Thayn Lands**, include all surface in Section 24, as well as all surface associated with Section 19, with the exception of Lot 4.

The surface of Lot 4 is owned by the United States of America. The legal description of Lot 4 would be the W1/2 of the S1/2 of SW1/4 of Section 19. Well G-3 is located in the N1/2SW1/4NW1/4 of Section 19.

Findings:

The permittee's surface land use agreement allows them the proper right of entry to drill wells G-1, G-2, and G-3.

LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

Analysis:

TABLE 1-1. DeGas Well Locations, Pine Canyon, Utah Quadrangle, Salt Lake Meridian as depicted on Page 1-1 of the submittal provides the legal descriptions for methane degasifications wells G-1, G-2, and G-3. PLATE 1-4, included with the submittal depicts the three well locations as they relate to the permit boundary for the Dugout Canyon Mine. Therefore, the need for the applicant to address that the permit area is within an area designated as unsuitable for mining is unnecessary. The well locations exist within the area that has been permitted for coal extraction.

Findings:

The minimum regulatory requirements have been addressed.

PERMIT TERM

Regulatory References: 30 CFR 778.17; R645-301-116.

Analysis:

The current State of Utah mining permit issued by the Division of Oil, Gas and Mining was renewed on March 3, 2003. Same remains in affect until March 16, 2008. The proposal to drill the three methane degasification wells for the Dugout operation has been received during the current permit term.

Findings:

The minimum regulatory requirements have been met.

PUBLIC NOTICE AND COMMENT

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

Analysis:

The proposal to permit and drill the three methane degasification wells at the Dugout Mine will occur on private surface land managed by the heirs of the Milton and Ardith Thayn Trust. The permittee has included, as part of the application, a copy of the surface lease agreement between the Trust and Canyon Fuel Company. There is no need for a public notice and comment period.

Findings:

The requirements of this regulation are not relative to this application.

FILING FEE

Regulatory Reference: 30 CFR 777.17; R645-301-118.

Analysis:

The proposal to drill the three methane de-gasification wells is not a permit application, but is an amendment to the currently approved mining and reclamation plan.

Findings:

This requirement is not relative to this permit amendment.

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

This proposal is an amendment or modification to the currently approved mining and reclamation plan, which is an integral part of the permit. The determination that the permit application consisted of the proper format and adequately addressed the requirements of the disciplines relative to completeness was made prior to the receipt of this application.

Findings:

A determination that the permit application was administratively complete was made prior to receipt of this amendment. This requirement is not relative.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Dr. Patrick Collins of Mt. Nebo Scientific, Inc. conducted the July 2003 vegetation inventory as well as the threatened, endangered, and sensitive plant species inventory (Attachment 3-1).

Dean Stacy of NRCS (Price office) conducted the August 2003 productivity estimates.

DWR (Chris Colt and LeRoy Mead) conducted the 2003 raptor survey.

Environmental and Engineering Consultants (EIS) conducted the Mexican Spotted Owl (MSO) survey. Vicky Miller (personal communications, 8/12/03) clarified that Tom Paluso (EIS engineer) conducted the survey. The amendment contains a copy of the corporate TE permit (exp. 12/31/05) with Mel Coonrod as principal officer. In order for a person to conduct official surveys, they must have fulfilled the following sequential requirements:

- Belong to the permit holding corporation.
- Take the species-specific course and exam.
- Submit the application for permit to the USFWS.
- Record name to the corporate permit records.

The corporate permits shows that Tom Paluso is authorized to conduct MSO surveys.

Baseline soils information (Attachment 2-1) was compiled by Mr. Dan Larsen (Soil Scientist) with EIS Environmental and Engineering Consulting. Mr. Larsen's resume is attached with the report.

Attachment 2-2 (topsoil calculations) was prepared by Layne Jensen of EarthFax Engineering, Inc. Mr. Jensen is a professional engineer. The address and credentials of the company or individual are attached to the report.

Dr. John A. Senulis, owner of SENCO-PHENIX, Price, Utah, conducted an archaeological investigation. Dr. Senulis' credentials are attached to the report.

Findings:

The information provided is adequate for the reporting of technical data requirements of the regulations.

MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

Analysis:

All maps and plans that have been submitted with the application which are relative to well location, pad design, hydrology, or engineering design are certified by a Utah registered professional engineer.

Findings:

The minimum regulatory requirements have been addressed.

COMPLETENESS

Regulatory Reference: 30 CFR 777.15; R645-301-150.

Analysis:

The permittee's initial application to permit three degasification wells for the Dugout Mine long-walling system was received on August 1, 2003. Three additional submittals containing revised or additional information were made on August 28th, September 4th, and September 10, 2003. The provided information is felt to be complete and adequate, as all disciplines have made a recommendation for approval of the amendment.

Findings:

The provided information meets the minimum regulatory requirements for completeness.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

Much of the information concerning the mine permit area environmental resources are provided in the MRP and confidential files. The Permittee provides supplemental information specifically concerning the degas wells in this amendment.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.12; R645-301-411.

Analysis:

Attachment 4-1 contains the results of a cultural resource survey conducted by Senco-Phenix of Price Utah in June 2003. There were no cultural resources located within the 56-acre area surveyed.

The report documents previous surveys filed with the Utah Division of State History in which one archeological site and two cultural resources were mentioned. Neither cultural resource was recommended for nomination to the historic register. The archaeological site (42CB292) is the historic Snow Mine in Pace Canyon. The location of this site is shown on a map in the June 2003 report. Avoidance of this site was recommended pending further historic research. The archaeological site is located along the Pace Canyon road that will be used to access the drill hole sites. The Permittee has provided assurance that the degas hole developments will not impact what remains of the archaeological site.

Findings:

The information meets the minimum requirements for Historic and Archaeological Resource Information.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

Dr. Patrick Collins of Mt. Nebo Scientific, Inc. conducted the June 2003 (July) vegetation inventory as well as the threatened, endangered, and sensitive plant species inventory (Attachment 3-1). The inventories covered the proposed three well sites (~200 x 300 feet) and two-associated reference sites. Dr. Collins used the following approved methods for the vegetation inventory:

- Meter square quadrat method for cover.
- Point-quarter method for woody species density.

Table 1 shows the results of the vegetation inventory for percent cover, percent cover by life forms, and woody species density.

Table 1. Vegetation inventory

Site	Total Living % Cover	Grass % Cover	Forb % Cover	Woody % Cover	Woody Sp. Density Individ/Acre
Ref Area Aspen/Doug	90	15	34	51	4265
G1 (A/D) Prev disturb	38	21	50	28	1241
Ref Area Sage/Snow	63	17	46	37	4811
G2 (S/S) Undisturbed	66	18	39	44	4812
G3 (S/S) Undisturbed	60	12	44	44	6306

Table 1 notes that G1 was previously disturbed (prev disturb). Dr. Collins notes that the G1 disturbance includes an old road and logging remains. The woody percent cover for the G1 site appears lower than for the reference area. The woody species density for the G1 site is significantly lower than for the reference area. The other two degas well sites are apparently similar in cover and community composition. There is no significant difference in woody species density between the G2 site and the reference area. The woody species density for the G3 site is significantly lower than for the reference area. Dr. Collins notes a concern of meeting performance standards (Attachment 1, pg. 14). Meeting the standards for G1 may not be a concern provided a full commitment by the mine operator to implement and direct the approved DOGM reclamation procedures.

There are two reference areas for the degas wells: 1-Maple, aspen, Douglas fir, and 2-Sagebrush, snowberry, grass. These names/descriptions reasonably correspond to the descriptions of the community types categorized on Plate 3-1 of the MRP. The Division had a concern over the apparent close proximity of the Sagebrush, snowberry, grass reference area to the road. The Permittee mentioned (personal communications 8/19/03) that this reference area is at least 500 feet from the road on one side and 2000 feet on the other side. The Permittee assures the Division that no disturbance will occur to the area other than grazing. If conditions change and disturbance is evident, the Permittee plans to fence this reference area on the two sides that face the adjacent road. The other reference area is apparently protected from disturbance by the natural topography.

The Permittee provided productivity values for three degas wells and two associated reference areas. Pre-disturbance (apart from G1) productivity values are particularly important for these sites because the post-mine land use is grazing. Dean Stacy of NRCS (Price office) conducted the August 2003 productivity estimates.

NRCS states that the sage/snowberry community is experiencing changes in productivity values with a decrease in herbaceous values and increase in woody plant values. Mr. Stacy believes that this change is a result of previous land management practices (*or lack of*). This lack of management is resulting in sagebrush becoming the dominant species. In a normal year, productivity is expected to be 1,500 lbs/acre (1988 Carbon County Soil Survey). This reported value matches the value estimated by NRCS in 2003.

The 2003 productivity values for the aspen/Douglas fir reference area are 40% lower than values reported in the 1988 Carbon County Soil Survey. Mr. Stacy notes that this community is also experiencing changes in productivity values with a decrease in herbaceous values and increase in woody plant values. Furthermore, that G1 shows no resemblance to its assigned community type or expected productivity value because of previous disturbance. NRCS believes that the change in community condition is a result of previous land management practices (*or lack of*).

Table 1. Production results

Site	Productivity Lbs. per acre
Ref Area Aspen/Douglas fir	300
G1 (A/D) Previously disturbed	100
Ref Area Sage/Snow	1,500
G2 (S/S) Undisturbed	1,500
G3 (S/S) Undisturbed	1,500

Findings:

The information provided is adequate for the reporting of vegetation resource requirements of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Previously, the Permittee provided the following information concerning TES for different sites of the mine permit area:

The Permittee provided a TES inventory (Incoming 2003; Degas Wells MW-6 and –8; Attachment 3-2) conducted by Mr. David Steed (Ecologist) of Environmental and Engineering Consulting on May 10, 2002. The TE survey was not comprehensive and included surveys for TE species not listed for Carbon County. The survey crew surveyed for twenty-seven plant and two animal species. These species are included on federal threatened and endangered (TE) list for Carbon and Emery counties or on sensitive lists for the area.

For the sites evaluated for TE species, including MW–6 and –8, the surveyors noted "no observation" for all species surveyed. The survey, however, shows suitable habitat for the following species:

Last chance townsendia (Townsendia aprica – USFS SS; Emery, Sevier, et. al.)
Tufted cryptantha (Cryptantha caespitosa - CS; Carbon)
Canyon sweetvetch
(Hedysarum occidentale var. canone – USFS SS; Manti-LaSal/Carbon, Emery, et. al.)
Helenium hymenoxys (Hymenoxys helenioides – CS; Carbon, Emery, Sevier, et. al.)
Bicknell milkvetch
(Astragalus consobrinus - USFS SS; Manti-LaSal-potential/Emery, Sevier)
Basalt milkvetch (Astragalus subcinereus – BLM SS; W.Emery, E.Sevier)
Sedge fescue (Festuca dasyclada – USFS SS; Manti-LaSal/Emery)
Graham beardtongue
(Penstemon deaveri – Utah Heritage Program; extreme northeastern corner of Carbon County)

[Parenthetical information shows species name and DOGM research results for management responsibility; county or forest location.]

It is evident from the list that three of the seven species are tracked in Carbon county: Tufted cryptantha, Canyon sweetvetch, and Helenium hymenoxys. The other four species in the list were probably included as an oversight by Mr. Steed because he included Emery County in the TES survey. A June 24, 1995, survey for canyon sweetvetch found this sensitive species along Dugout Creek approximately one-half mile below the gate. The Division is aware of a fairly extensive population in the permit area in Fish Creek Canyon, and the plant could occur in other parts of the permit area and proposed addition.

EIS conducted a survey of the proposed M-series drill sites on June 21, 2001. The consultants surveyed for the loggerhead shrike, burrowing owl, canyon sweetvetch, and Creutzfeldt cryptantha. The inventory found no suitable habitat for any of the species except the canyon sweetvetch. The sweetvetch was not found within any of the areas to be disturbed.

For the current amendment, Dr. Collins conducted a literature search on TES plant species for the degas wells. Note that G1 and G2 are in same township and range as MW-6 and –8. His results showed that the area includes suitable habitat only for canyon sweetvetch (*Hedysarum occidentale* var. *canone*). Dr. Collins did not specifically mention Tufted cryptantha, Helenium hymenoxys, or Graham beardtongue in his literature or survey results. The surveyor ground-truthed (June 2003) for TES plant species and observed no TES species growing at any of the three degas well sites or reference areas.

Previously, the Permittee provided the following information concerning the MSO for different sites of the mine permit area:

EIS conducted a survey for the MSO in Pace Canyon on June 18 to July 3, 2001. The surveyor used the USFWS established protocol for the MSO. The results showed no spotted owl in the area surveyed even though suitable habitat exists.

The Permittee provided Final Report: Assessing the impact of scale on the performance of GIS habitat models for MSO David W. Willey, October 22, 2002 (Incoming 2003; Degas Wells MW-6 and –8; Attachment 3-3). The report summarizes the study that evaluated the performance of the 1997 and 2000 models developed by Dr. Willey et. al. for predicting MSO habitat. The study included four project areas near Price.

For the current amendment, Tom Paluso of Environmental and Engineering Consultants (EIS) conducted a MSO survey for Dugout Canyon. The consultant conducted a ground-truth survey (May 20 - June 18, 2003) for MSO habitat within a half-mile radius around the G1-G6

degas well area. The calling procedure included calling at 7 different points with points no greater than 0.5 mile apart. The consultant called for 20 minutes using three different calling types. The results showed no MSO responses within a half-mile radius around the G1-G6 degas well area. The results, however, showed responses from Great Horned Owl (5/20/03: site not provided) and Northern Saw-whet (5/20/03: G2; 5/27: G6; 6/4: G6 and G5; 6/11: G3).

> *Previously, an EIS survey documented two saw-whet owls responses. One saw-whet owl was heard near drill hole DT-2. The Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (Laura Romin and James Muck, May 1999, U.S. Fish and Wildlife Service, Utah Field Office, Salt Lake City) require a 0.25-mile seasonal buffer from March 31 to August 31 for this species. Chris Colt, UDWR[1], stated that the survey did not locate an owl nest but only the owl's response to a call. The survey did not attempt to locate saw-whet owl nests. Mr. Colt stated that if young owls were present then they should be mobile by July 15 in this area. However, Mr. Colt recommended that a one or two night survey be conducted within a 300-meter perimeter of drill pad DT-2 prior to drilling. Limiting drilling to after August 31 or surveying to be sure no nest occurs within 300 meters of the drill pad will ensure compliance with the Migratory Bird Treaty Act.*

DWR conducted the raptor survey in 2003. The Permittee provides a summary table of DWR's results and maps of the overflight survey. The amendment states (pg. 3-3) that the 2003 results showed "no raptor nests…recorded in the survey area" of the degas wells (sections 24 and 19). The Permittee provided a map showing the overflight pattern, locations of raptor nests, but not locations of the drill hole sites or boundary lines of the mine permit area. The map shows that a Red-tailed Hawk nest 1304 is on the border of section 24 and 13. The results, however, show that this nest was "inactive" on 5/21/03.

Other than the raptor and MSO survey, there was no other TES animal species survey for the degas wells. The amendment includes two tables (Attachment 3-2): Utah's State Listed Species by County (Carbon) and County Lists of Utah's Federally Listed TEC species (Carbon). Page 3-3 states that there are no known federal or state listed TES species within the area of the degas wells. The bald eagle and black-footed ferret, however, could potentially inhabit the area (Incoming 2003; Degas Wells MW-6 and –8; section 322.220). Although there have been no confirmed sightings of black-footed ferrets in Carbon County in several years, bald eagles probably occur within the permit area during the winter.

The Permittee mentioned (8/12/03) that she read all the animal species on the two tables to Bill Bates (DWR) and that he supports that no known TES are within the degas well area. As required by R645-301-358.100, the permittee must promptly report to the Division siting(s) of

[1]Phone conversation on August 10, 2001.

state or federally listed endangered or threatened species within the permit area. Seasonal or migrating bald eagles are expected and would not need to be reported.

JBR Environmental Consultants conducted the bat survey in June 2002 (Incoming 2003; Degas Wells MW-6 and –8; pg. 3; sec. 322.200). The previous attachment, however, did not provide the survey report. The current amendment also does not include the bat survey. The Permittee mentioned (personal communications 8/11/03) that the bat survey in 2002 was required because Dugout was planning to mine in escarpment areas. The mine operator never mined in that area of concern. The Permittee states that there is no bat habitat in the area of the degas wells; therefore, the bat survey does not apply.

Plate 3-2 shows the G-series degas wells are located near (approximately 1 mile) critical deer winter range and elk winter range.

Findings:

The information provided is adequate for the reporting of fish and wildlife resource requirements of the regulation.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

Attachment 2-1 provides a soil inventory for six potential well sites. The inventory was conducted by Mr. Dan Larsen in June 2003. This proposal is concerned only with sites G-1, G-2, and G-3. Site sketches provide valuable estimates of topsoil thickness over the entire site (Appendix 6-7 of Attachment 2-1). Mr. Larsen states in the introduction that each site will be developed to a 0.5-acre size and therefore topsoil calculations must be adjusted for the larger sites described by the application.

Site G-1:

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) places G-1 in the Rabbitex family – Datino Varient complex (Appendix 6.2 – 6.4 of Attachment 2-1). The site is located on a ridge with a gentle north pitch and was previously disturbed by logging and soils are compacted and displaced. Closer inspection suggests the site has some characteristics of the Midfork-Commodore Complex and the profile description (Appendix 6-6 of Attachment 2-1) for the site places it in the Comodore Series Loamy-skeletal, mixed, superactive, frigid Lithic

Haplustolls). Topsoil is estimated at between 5 and 14 inches (Appendix 6-7 of Attachment 2-1). Lithic contact at 14 inches.

According to the information provided in Appendix 6-4 of Attachment 2-1 the Comodore Series is a shallow soil with a surface layer of nine inches over extremely stony subsoil. Lithic contact (bedrock) ranges from 10 - 20 inches. The effective rooting depth of Commodore soils is 20 inches. The potential plant community in this series is Douglas-fir and canopy of 50%, and understory including 40% grasses, 15 forbs, and 45% shrubs. The important plants are Rocky Mountain Juniper, birchleaf mountain mahogany, snowberry Salina wildrye, slender wheatgrass, Elk sedge, and Indian ricegrass. The Commodore series is in the Mountain Very Steep Stony Loam (Douglas-fir) woodland site. In a normal year productivity is expected to be 500 lbs/acre (1988 Carbon County Soil Survey).

Site G-2:

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) places G-2 in the Beje-Trag complex (Appendix 6.2 – 6.4 of Attachment 2-1). The site is located along a swale and a slight alluvial fan and is vegetated with sagebrush/grass and a few small juniper trees. Closer inspection of the site places it in an inclusion of the Brycan soil series (fine loamy, mixed, superactive, frigid Cumulic Haplustolls). The slope is between 8 – 15% to the east and north. Topsoil is estimated at 30 inches but is greater than 40 inches in the southeast corner (Appendix 6-7 of Attachment 2-1).

The Brycan soil series are very deep soils with a mollic epipedon 20 – 36 inches thick. The effective rooting depth is twenty inches. Brycan soils are formed in sloping alluvial valleys at high elevation. The potential plant community on the Brycan soil is 60 % grasses, 10 % forbs, and 30 % shrubs. The important plants are mountain big sagebrush, Antelope bitterbrush, Utah serviceberry, snowberry, Indian ricegrass, bluebunch wheatgrass, Letterman needlegrass, and Salina wildrye. The Brycan series is in the Mountain Loam (Salina Wildrye) range site. In a normal year productivity is expected to be 1,500 lbs/acre (1988 Carbon County Soil Survey).

Site G-3:

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) places G-3 in the Beje-Trag complex (Appendix 6.2 – 6.4 of Attachment 2-1). The site is located on a ridge and is vegetated with sagebrush, snowberry, and “associated species”. The site has a 10 – 20 % gradient to the east. Topsoils ranges from 8 inches on the west and northwest to 16 inches on the south and southeast (Appendix 6-7). The profile description (Appendix 6-6 o f Attachment 2-1) identifies the soil type as Trag (Fine-loamy, mixed, superactive, frigid Typic Argiustolls).

The Trag Series consists of very deep soils formed from weathered bedrock. The nine-inch topsoil layer transitions to a six-inch BA layer (having characteristics of both A and B

horizons). The mollic epipedon is the zone from 0 – 15 inches. The soil has an argillic horizon from 15 – 35 inches. The effective rooting depth is 60 inches. The potential plant community on the Trag soil is 60% grasses, 15% forbs, and 25% shrubs. Important plants are Antelope bitterbrush, Utah serviceberry, Mountain big sagebrush, snowberry, Salina wildrye, bluegrass, bluebunch wheatgrass, Indian ricegrass, and Letterman needlegrass. The Trag soil is in the Mountain Loam (Salina Wildrye) range site. In a normal year productivity is expected to be 1,500 lbs/acre (1988 Carbon County Soil Survey).

Soils were not analyzed during the topsoil survey. The application indicates that the topsoil from G-1, G-2 and G-3 will be analyzed for the following parameters during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent $CaCO_3$, plant available Nitrogen, Potassium, and Phosphorus (Section 243).

Findings:

The information provided meets the minimum requirements for Soils Environmental Resource Information.

LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.22; R645-301-411.

Analysis:

The pre-mining land use is open range for wildlife and livestock and hunting as described in Chapter 4. Table 3-1 provides productivity estimates between 300 – 1,500 lbs/ac (NRCS letter in Attachment 3-1). The highest productivity sites are G-2 and G-3 (Trag and Brycan soils) and the lowest productive is site G-1 Comodore series soil, previously disturbed by roads and logging.

The land is owned by the Thayn Trust and is the subject of the Surface Use Agreement between Canyon Fuels Co. and the Thayn Trust dated November 22, 1999 and the First Amendment to the Surface Use Agreement dated August 13, 2001 (Attachment 4-2). This agreement describes hunting as another use of the land. Communication with the landowner is found in Attachment 4-2.

Findings:

The information provided meets the Land Use requirements of the Regulations.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

The two sites are at elevations of 8,200 to 8,400 feet on the plateau between Dugout Canyon and Pace Canyon. Alluvial sediments deposited by Dugout and Pace Creek drainages are far below the site as shown on Plate 6-1 of the MRP. Although Site G-2 has soils in the Brycan series that developed from alluvial deposition, they are presently not being irrigated or cultivated. Site G-2 is currently being used for open range.

Findings:

The Division finds that the site is not located in an alluvial valley floor.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

Prime farmland does not exist at this elevation in the Book Cliffs. The growing season is short (60 days) and there is no developed water source. The Utah Agricultural Experiment Station Research Report Number 76 entitled "Important Farmlands of Parts of Carbon, Emery, Grand, and Sevier Counties" does not include R 12 E, T 13 S.

Regulation R645-302-313 requires that a reconnaissance inspection is done for all permit applications whether or not Prime Farmland is present and that the Division and Natural Resource Conservation Service will determine the extent of the reconnaissance inspection. On April 24, 2003, the Division consulted with Gary Roeder, Area Conservationist with the NRCS Price Field Office. Mr. Roeder stated that developments anywhere in the permit area at these elevations would not fit the parameters of prime farmland.

Findings:

The Division in consultation with the Natural Resources Conservation Service determines that there are no prime farmlands in the location of the proposed degasification wells G-1, G-2 and G-3.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

No new information has been provided with the current submittal. For geologic information the reader is referenced back to the currently approved Mine Reclamation Plan (MRP).

Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resources – Geologic Resource Information section of the regulations.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Probable Hydrologic Consequences Determination

Within the current submittal, the Operator has adequately identified any potential impacts to the hydrologic balance and has cited adequate mitigation for those potential impacts. No acid or toxic- forming materials have been identified in the soils or strata at the Dugout Mine and none are anticipated. Any groundwater encountered during drilling will be sealed with drilling mud to eliminate migration down the hole and into the mine. No hydrocarbons will be stored on site, but should any leak or spill occur, the saturated absorbent materials would be disposed of at a landfill facility.

Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resources – Hydrologic Resource Information section of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Vegetation Reference Area Maps

Figure 1 provides locations of the G1-3 drill holes on a topographic map. The Permittee assigned two new reference areas for the degasification wells. The locations of these two reference sites are shown in a topographic map in the Vegetation survey (Attachment 3-1, Figure 3-1. Figure 3-2 shows the vegetation types for the area specific to the degas wells.

Findings:

The information provided is adequate for the reporting of map resource requirements of the regulations.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

The purpose of the proposed methane de-gasification wells is to enhance the venting/dilution capability of the mine's ventilation system, such that dangerous levels of methane gas are not allowed to accumulate within the gob area (area where the coal seam has been extracted and the roof has been allowed to cave) and/or the bleeder entries. It is the permittee's intent to have the wells permitted, and then drill them, if it is decided that they are needed. At the present time, only minor delays have been experienced from methane buildup as the current longwall panel is being extracted. The permittee has verbally indicated that the wells will not be drilled as sequenced. If the permittee concludes that the additional venting capability is necessary, well G-3 will be the first to be put down. If additional capability is needed, well G-2 will be drilled, and so on. At the present time, six wells are being considered; however, only wells G-1, G-2, and G-3 are being permitted at this time.

As depicted on FIGURE 5-16, TYPICAL WELL DESIGN, the wells will be drilled to depths such that the hole bottom will stop twenty-five feet above the roof elevation of the Gilson coal seam. Depending on the amount of overburden at the specific well site, the well depths could vary from 1250 to 2050 feet.

Chapter 6, Geology, page 6-2, section **625**, states "it is not anticipated that any additional geologic data will need to be collected at the well sites". Section **624.300** also states "no test boring(s) or drill cores are planned at the site". Therefore, none of the coal seam will be extracted for analysis. The wells will be permitted as a mining related activity under the R645 coal rules.

None of the methane wells will be plugged post drilling, as their purpose is to bleed off the combustible gases within the mine, improving safety conditions and mining productivity. The anticipated life/usage of the degasification hole(s) is unknown at this time.

Findings:

The amendment does not qualify as a minor coal exploration amendment, and therefore, same will be reviewed as an amendment to the mining and reclamation plan.

EXISTING STRUCTURES:

Regulatory Reference: 30 CFR 784.12; R645-301-526.

Analysis:

The proposal to construct the methane degasification wells will occur in an area well outside of the disturbance created by the mine's facilities. There are no known dwellings, public buildings, schools, churches, or community buildings within 1,000 feet of the pre-determined well locations. There is no indication that blasting will be done during the construction/ reclamation process of the well sites. This regulation is not applicable.

Findings:

There are no known structures in the area of the methane well development sites. This regulation is not applicable.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

Regulatory Reference: 30 CFR784.17; R645-301-411.

Analysis:

There are no public parks in the area where the three wells are being proposed. Archaeological surveys of the well sites were conducted in June of 2003; with nothing being found that required future investigation. There are no cemeteries, or units of the National System of Trails or the Wild and Scenic Rivers System located within the wells site boundaries, (See report included as Attachment 4-1).

The permittee has agreed to notify the Utah State Historic Preservation Office of previously unidentified cultural resources discovered during the course of operations of the wells.

Findings:

The submitted information is adequate to meet the minimum regulatory requirements of this section.

RELOCATION OR USE OF PUBLIC ROADS

Regulatory Reference: 30 CFR 784.18; R645-301-521, -301-526.

Analysis:

All access roads within the surface lease agreement area are owned by the surface landowners, the heirs of the Milton and Ardith Thayn Trust. There are no public roads involved in the submittal.

Findings:

This regulation is not applicable to this submittal.

AIR POLLUTION CONTROL PLAN

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

Analysis:

The permittee's submittal commits to watering of the access roads (both the private surface roads as well as the portions to be constructed. See Chapter 4, page 4-4, section **424, Fugitive Dust Control Plan**). The application of water will be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition unless it is below freezing.

Findings:

The submitted information meets the minimum regulatory requirements of this section.

COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

Analysis:

As stated previously, the methane wells will be drilled to depths varying from 1250 to 2050 feet, depending on the amount of overburden at the well location. All boreholes will be stopped at a depth that correlates to twenty-five feet above the roofline elevation of the Gilson coal seam. No coal will be recovered from the seams that are being mined within the Dugout Mine permit area. No test borings or drill cores are planned at the well sites.

Findings:

This regulation is not applicable to this amendment.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

A discussion relative to **Structures and Renewable Resource Lands** is included as part of Chapter 5, page 5-27 of the Dugout Canyon Mine mining and reclamation plan. Same indicates that there are no major electrical transmission lines, pipelines, or agricultural drainage tile fields within the area to be extracted using long wall mining methods. All roads in sections 19 and 24 are the private property of the heirs of the Milton and Ardith Thayn Trust. As previously mentioned, the permittee has been granted use of these roads via the surface lease agreement between Canyon Fuel Company and the heirs of the Milton and Ardith Thayn Trust.

Subsidence Control Plan

Chapter 5, page 5-7, section **525 Subsidence** of the application indicates "no subsidence will occur at the well sites, as a result of drilling and development of the degasification well sites. Subsidence could occur at the well site because of underground mining..." The application references Section 525 of the approved mining and reclamation plan.

As the long wall panel is extracted from the Gilson seam, the roof will cave behind the shields as the face is mined and the shields are advanced. Although the broken material will swell to a certain extent as it breaks and falls, some settling of material will propagate to the surface, and the elevation of all surface over the extracted panel will be diminished.

Subsidence Monitoring is discussed on pages 5-28 through 5-31 of the approved mining and reclamation plan. The commitment made by the permittee on page 5-30 is to install one monitoring point per panel. According to Ms. Vicki Miller on August 13, 2003, a new marker to monitor the panel associated with the three proposed gob vent boreholes has been surveyed adjacent to well location G-3. The marker has yet to be installed as of the date of writing this technical memo. Although the installation of the monitoring point is not necessary relative to a recommendation for approval of the installation of the methane wells, the permittee should

ensure that the subsidence monitoring survey point is installed prior to initiation of the panel extraction process.

Performance Standards For Subsidence Control

The permittee has an approved subsidence control plan in place, as evidenced via review of the approved mining and reclamation plan.

Notification

Chapter 5, page 5-34, section **525.300 Public Notice of Proposed Mining**, indicates that "each owner of property or resident within the area above an underground mining block and adjacent area that may be affected by subsidence will be notified by mail at least six months prior to mining or within that period if approved by the Division". That notification will include 1) the identification of specific areas in which mining will take place, 2) dates the specific areas will be undermined, and 3) the location or locations where the Dugout Canyon Mine subsidence control plan may be examined.

Findings:

The information provided meets the minimum regulatory requirements of this section.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

Site G-1:

Table 1-2 states G-1 will be 0.6 acres of disturbance. Table 2-1 indicates 415 cu yds of topsoil will be salvaged (average depth of salvage is stated as 7 inches in Section 222.400). Figure 5-1 provides a contour map. Figure 5-2 provides the site layout during construction. Figure 5-3 provides cross-sections for site development. Figure 5-4 provides the operational layout for the life of mine. A fifty-five foot access road will be developed (personal communication with Chris Hansen and Vicky Miller on August 6, 2003).

The Division expects this site will generate 8,450 cu ft of material (313 cu yds) of topsoil and the access road (40 ft X 25 ft) will generate an additional 550 cu ft or 18.5 cu yds. This is an average of 0.58 feet of topsoil salvaged from the site. EarthFax calculations for soil salvage are provided in Attachment 2-2. They are 10,398 cu ft for the pad (385 cu yd) and 802 cu ft (29 cu yds) for the road. The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-1. Projected topsoil dimensions are 55 ft x 35 ft x 16 ft high (Table 2-2).

The plan indicates that 6 inches of subsoil will be salvaged and stored in a berm around the site. Appendix 6-6 of the soil survey indicates that there is approximately 7 inches of subsoil and that bedrock is encountered at 14 inches. The Division estimates that seven inches of subsoil over the 0.5-acre site would provide about 400 cu yds of subsoil for use in the berms. The perimeter of the site is shown on figure 5-3 as 500 feet (not including topsoil stockpile). The berm design is described in Appendix 7-1, the volume of soil required for construction of the berm is estimated at 161 cu yd (Section 231.100). The Division estimates that approximately 185 cu yds is required for the 5 ft x 2 ft x 500 ft berm for the majority of the site. In either case, there should be plenty of subsoil for the berm construction around the perimeter and around the topsoil stockpile.

Figure 5-2 indicates in cross section A-A that the site will be cut to a depth of about 3-4 feet on the west side (hard to tell from the scale). Cross-section B-B indicates that the mud pit will be incised to a depth of nine feet on the south of the site. At site G-1 shallow depth to bedrock may require a portable container for drilling fluid.

Site G-2:

Table 1-2 states G-2 will be 1.21 acres of disturbance. Table 2-1 indicates 3,104 cu yds of topsoil will be salvaged (average depth of salvage is stated as 30 inches in Section 222.400). Figure 5-5 provides site contours. Figure 5-6 provides typical cross-sections. Figure 5-7 shows the construction layout, approximate dimensions are 155ft x 135 ft or 20,925 sq ft, or about 0.5 acres. Figure 5-8 shows the operational layout for the life of mine, no dimensions are presented. A three hundred seventy foot access road will be developed to the site (personal communication with Chris Hansen and Vicky Miller on August 6, 2003).

The Division expects this site will generate 47,125 cu ft of material (1,745 cu yds) of topsoil and the access road (370 ft X 20 ft) will generate an additional 713 cu yds. This is an average of thirty inches topsoil salvaged from the site. EarthFax calculations for soil salvage are provided in Attachment 2-2. They are 58,612 cu ft for the pad (2,170 cu yd) and 25,185 cu ft (933 cu yds) for the road. The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-2. Proposed dimensions for the stockpile are 156 ft x 50 ft x 20 ft high (Table 2-2).

Figure 5-6 cross section A-A' shows a twelve foot cut slope on the northeast half of the site. No cut/fill calculations are presented, but the Division estimates that after the 30 inches of

topsoil is removed, this cut will generate 54,375 cu ft of soil (2,013 cu yds), based on the average 4 ft depth of cut to level the northeast section of the site. The berm design is described in Appendix 7-1; the volume of soil required for construction is estimated at 254 cu yds (Section 231.100). In either case, there should be plenty of subsoil for the berm construction around the perimeter and around the topsoil stockpile.

Site G-3:

Table 1-2 states G-3 will be 0.97 acres of disturbance. Table 2-1 indicates 1,182 cu yds of topsoil will be salvaged (average depth of salvage is stated as 12 inches in Section 222.400). Figure 5-9 provides a contour map. Figure 5-11 provides the site layout during construction. Figure 5-10 provides cross-sections for site development. Figure 5-12 provides the operational layout for the life of mine. A ninety-foot access road will be developed (personal communication with Chris Hansen and Vicky Miller on August 6, 2003).

The Division expects this site will generate 24,000 cu ft of material (888 cu yds) of topsoil and the access road (90 ft X 20 ft) will generate an additional 66 cu yds. This is an average of twelve inches topsoil salvaged from the site. EarthFax calculations for soil salvage are provided in Attachment 2-2. They are 29,805 cu ft for the pad (1,104 cu yd) and 2,118 cu ft (78 cu yds) for the road. The Permittee's estimate of recoverable topsoil (Table 2-1 exceeds the Division's for site G-3. Proposed dimensions for the stockpile are 70 ft x 60 ft x 17 ft high (Table 2-2).

Figure 5-10 cross section A-A' shows a twelve to fifteen foot cut slope on the southern two-thirds of the site. No cut/fill calculations are presented, but the Division estimates that after the 12 inches of topsoil is removed, this cut will generate 39,750 cu ft of soil (1,472 cu yds), based on the average 5 ft depth of cut to level the southern two-thirds of the site. The berm design is described in Appendix 7-1; the volume of soil required for construction is estimated at 208 cu yds (Section 231.100).

All sites:

The volume of material excavated for the mud pit at each site is estimated at 97 cu yds (Section 231.100).

The topsoil stockpiles will be within the perimeter fence so that the stockpiles are not overgrazed. Berms around the topsoil stockpiles will be constructed of subsoil.

Vegetation will be removed and stored on the perimeter of the disturbed area for use in reclamation (Section 231.100) or alternatively hauled offsite for disposal (Section 232.600) at the discretion of the Permittee. The Division's preference is for the grubbed vegetation to remain on site to be used as cover and protection for the reclaimed site.

A qualified person will supervise the soil salvage operations (Section 231.100). Steepness of grade has not been cited as a limitation to topsoil salvage at these sites (Section 232.700). A dozer or front-end loader will be used for topsoil removal (Section 232.100). The stockpile dimensions for each site are outlined in Table 2-2. Slopes of the construction stockpile will be established at 1h:1v (Section 231.400). The slopes of the long-term topsoil piles (operational or venting phase) will be reduced to 2h:1v before seeding (personal communication with Vickie Miller on September 3, 2003). (The Division requested that operational slopes of the topsoil piles are no greater than 2h:1v as this is generally considered to be the angle of repose for unconsolidated soils.)

A berm or silt fence will be constructed around the stockpile and the stockpile will be roughened and seeded with the mix described in Table 3-2 (Section 234.200).

A commitment in Section 243 of the application indicates that during salvage, the soils of G-1, G-2, and G-3 will be analyzed for the following parameters: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent $CaCO_3$, plant available Nitrogen, Potassium, and Phosphorus.

Findings:

Slopes will be reduced to 2h:1v during the operational phase of the site and before seeding (personal communication with Vickie Miller on September 3, 2003). The information provided meets the minimum requirements of the Operation Plan, Topsoil and Subsoil removal.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Road Classification System

The privately owned access roads will remain in place after the venting phase of each of the wells is completed. The road lengths that will be constructed to access each of the well sites are classified as "primary" and will be reclaimed upon the final reclamation of the well sites. FIGURE 5-14, TYPICAL ACCESS ROAD CROSS SECTION depicts the basic design that will be used to construct the roadway lengths that are necessary to access the methane well pads. A roadway width of twenty feet will be cut/filled in the following lengths; G-1 will have a fifty-five foot access road development length. G-2 access will require a 370-foot roadway development

length. G-3 will require a ninety-foot roadway length. FIGURE 5-14 is P.E. certified by Mr. Layne Jensen, Utah registered professional engineer.

Plans and Drawings

The application contains a typical road cross section for the lengths of access which require construction, FIGURE 5-14. The drawing depicts an access roadway width of twenty feet, showing a road cut. The drawing is P.E. certified by Mr. Layne Jensen, Utah registered professional engineer.

Plan views of the "to be constructed" access road lengths are depicted on FIGURES 5-1, 5-5, and 5-9. These are the contour maps for wells G-1, G-2, and G-3. All figures are P.E. certified by a Utah registered professional engineer.

Primary Road Certification

The permittee's application classifies all of the roadway lengths that require construction to access the wells as primary. The roads will have surface constructed of compacted native subsoil material. The roads are depicted on FIGURES 5-1, 5-5, and 5-9; the figures are the contour maps for wells G-1, G-2, and G-3. All roadway lengths that are developed as access to the well pad locations will be reclaimed upon the completion of the methane venting process.

Findings:

The information provided meets the minimum regulatory requirements of this section.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal Of Noncoal Mine Wastes

All noncoal waste generated by the well drilling activities will be disposed of in the same manner as waste generated at the main mine facilities area.

There will be no noncoal waste disposal areas at any of the proposed well sites.

Coal Mine Waste

Chapter 5, page 5-3, section 513.300 Underground Development Waste, Coal Processing Waste, and Excess Spoil addresses this requirement. None of these types of material will exist at the well sites.

Refuse Piles

No refuse piles will exist at the well sites, (Chapter 5, page 5-15, Section **553.250, Refuse Piles**).

Impounding Structures

"No impoundments will exist at the well sites, " (See **Chapter 5**, page **5-4**, section **515.200 Impoundment Hazards** of the submittal).

Burning And Burned Waste Utilization

This section is not applicable to this submittal.

Return of Coal Processing Waste to Abandoned Underground Workings

No coal processing waste will be generated within the well sites, (Chapter 5, page 5-15, section **553.200 Spoil and Waste**).

Excess Spoil:

This section is not applicable to this submittal.

Findings:

The permittee has addressed those sections that are felt to be relevant to the proposed drilling of the three methane vent wells. The submitted information is adequate to meet the minimum regulatory requirements of this section.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Groundwater Monitoring

There are no active groundwater monitoring sites within two-miles of any of the drill sites. Well GW-19-1 was only monitored in August and October 1997 and Well GW-24-1 has been blocked since 1998.

Surface Water Monitoring

There are no active surface water monitoring sites within two-miles of any of the drill sites. The streams in the area are ephemeral or are ephemeral in nature. No adverse effects to the surface drainages are anticipated.

Acid- and Toxic-Forming Materials and Underground Development Waste

The well design is shown on Figure 5-16. The well will be drilled to a depth twenty feet above the coal seam (approximately 2,000 feet). Fragments of various rock strata will be brought to the surface with the air drill along with any water encountered. After drilling is completed, the mud pit will be allowed to dry and the drilling fragments will be mixed with the excavated subsoil from the mud pit. This practice should reduce any potential concentrations of salinity or acidity.

Previous investigations have not found acid or toxic materials in the strata (Section 623 and Appendix 6-1 and 6-2). Water was encountered during drilling at this location at a depth of about 1500 feet. There has been no water reported during monitoring in this vicinity. The Division does not expect there to be a problem with acid/toxic materials and does not expect there will be much water encountered in the drilling.

Discharges Into An Underground Mine

If any water is encountered during drilling, the formation will attempt to be sealed using drilling mud. During completion of the well, solid casing and grout will be used to ensure no water leaks into the mine.

Water-Quality Standards And Effluent Limitations

Section 751 of the Methane Degasification submittal indicates any potential overflow of the mud pit will be pumped into a tank and hauled from the site; indicating no discharges will occur at the site. No viable water resources are located within 2,000-feet of any of the drill holes with the exception of a stock pond located approximately 600-feet of Drill Site G-2. If any

excess water is encountered, it is recommended that the water be treated in the pond, and run through a silt fence to be adequately treated then discharged from the site.

Sediment Control Measures

Road Drainage – No diversion ditches are proposed for the primary roads leading to the well sites; however, water bars are to be used at Drill Sites G-1 and G-3 to divert water off roads prior to runoff reaching the drill pads. At Drill Site G-2, the removal of topsoil (24-30 inches deep) from the road does not allow for drainage from the road until the end without disturbing additional ground. It is anticipated that the subsoil is going to be very rocky, and the road will be cut with a little slope to allow drainage to one side. Any flow leaving the road at the end will be diverted to an existing stock pond located immediately downstream of the road.

Drill pads – The drill pads have been designed to minimize erosion and flow of sediment off the pads. A berm will be constructed around the perimeter of the disturbed area and flow will be directed to silt fences. The drill pads will be constructed so that sheet-flow will be directed to areas of 'cut' material instead of 'fill' material areas to reduce the potential of erosion. During intermediate reclamation, sheet flow will be directed to silt fences discharging to areas of minimal (if any) intermediate reclamation.

In Section 752 – Control Measures of the submittal, the Operator commits that, "All sediment control measures will be located, maintained, constructed, and reclaimed according to plans and designs presented in Section 732, 742, and 760 of this submittal".

Casing and Sealing of Wells

In Section 542.700 of the Degasification Well amendment the Operator commits to sealing wells in accordance with Federal and State Regulations. At abandonment, the holes will be plugged at the bottom, and a lean concrete mixture will be poured into the casing until the concrete is within five (5) feet of the surface. The casing will be cut off at ground level and filled to the surface with concrete.

Findings:

The information provided adequately addresses the minimum requirements of the Operation Plan – Hydrologic Information section of the regulations.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

Analysis:

The proposed methane vent wells are intended to enhance the mine ventilation system, allowing additional venting and dilution capability for the combustible mine gases that are inherent in the coal seam, as well as the adjacent strata. Thus, they are a support facility.

Chapter 5, page 5-8, section **526.200 Utility Installation and Support Facilities** of the submittal addresses this requirement. According to that information, no utilities will be installed at the well sites. A portable methane-exhausting unit will be installed, and the operation of that machine will be initiated with portable propane bottles. Upon start up, the device will be switched over to operate from the methane concentrations venting from the well, and will thus be self-sufficient.

Findings:

The information provided meets the minimum regulatory requirements of this section.

SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

Analysis:

Chapter 5, page 5-6, Section 521.100, Signs and Markers addresses this requirement of the R645 coal rules. The application commits the permittee to install a mine and permit identification sign at each well site that is developed. The identification sign will contain the following information: Mine name, Company name, Company address and telephone number, MSHA identification number, and the permanent program identification number.

The application commits the permittee to install disturbed area perimeter markers to identify all acreage to be affected before beginning mining activities.

Stream buffer zone signs will not be required at any of the proposed well sites.

Topsoil storage signs will be placed on all topsoil stockpiles.

All signs and markers will be maintained until no longer needed, generally until all Phase III bond release requirements have been met.

Findings:

The information provided meets the minimum regulatory requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Mining Facilities Maps

The methane well submittal includes four maps/drawings for each of the three wells that are being proposed; these include:

1) A contour map, which depicts the undisturbed surface contour, and the relationship of the well pad.
2) A typical cross section for each well pad, depicting the pre-disturbed and final reclamation surface configuration, as well as the Operational surface configuration.
3) A plan view of the "approximate" drilling layout for each of the proposed well sites. The plan view shows the various method to control and treat intercepted precipitation, including sloping the pad(s), installation of berms and silt fences.
4) The fourth figure included with the series for each of the proposed well sites depicts the "approximate" operational layout for the venting process of the well. These figures also depict the reclaimed portion of each well.

All four figures for each of the three proposed wells are P.E. certified by Mr. Layne Jensen, Utah registered professional engineer.

Mine Workings Maps

Not applicable to this amendment.

Monitoring and Sampling Location Maps

All maps relative to this requirement are incorporated into the approved mining and reclamation plan for the Dugout Canyon Mine.

In Section 722.500 Cross Sections and Maps – Surface Topography of the submittal, a reference to Plate 1-4 has been included. This reference will illustrate the location of all three (3) holes relative to one another and the surface drainage.

Certification Requirements

As noted above, all plans, drawings, and maps that are relative to this submittal have been certified by a Utah registered professional engineer.

Findings:

The submitted information is adequate to meet the minimum regulatory requirements of this section.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

Upon completion of the drilling activities, all machinery will be removed and the mud pits backfilled and compacted. Approximately 60 to 70% of each disturbed acreage will be reclaimed by returning it to approximate original contour, (See Chapter 5, page 5-10, section **537.200, Regrading of Settled and Revegetated Fills)**, roughening, and reseeding the area. An exhaust blower will be set up to create a low pressure area across the well head, allowing the combustible mine gases to vent to the atmosphere. This will remain at the site for the length of the life of the well.

Upon completion of the venting phase, the blower and wellhead will be removed and the well casing will be plugged to the maximum depth possible. Final reclamation activities will commence, returning the remaining disturbed area to approximate original contour. Revegetation activities will commence; the only remaining equipment will be the disturbed area perimeter fence, and the permittee identification sign, which will remain until authorization is granted by the Division to remove same.

Findings:

The minimum regulatory requirements have been addressed.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

Chapter 5, page 5-15, section **553.100 Disturbed Area Backfilling and Grading, Post-Mining Land Use** indicates, "the disturbed area will be reclaimed in a manner that supports the approved post-mining land use. Refer to Sections 411 and 412 for additional detail."

Chapter 4, page 4-1, section **411.100 Pre-mining Land Use** of the submittal indicates, "the area is utilized for the landowners private use and as open range for livestock and wildlife." The area is also zoned by Carbon County for "mining and grazing, (MG-1)", (See section **411.130 Land Use Description**, Chapter 4, page 4-1 of the submittal). "There are no industrial or municipal facilities located on or immediately adjacent to the well sites."

Chapter 4, page 4-2, section **412.100 Post Mining Land Use Plan** indicates that the permittee will conduct all activities in the area such that "all uses of the land prior to the wells construction/operation and the capacity of the land to support prior alternate uses will remain available throughout the life of the sites. Dugout Canyon intends (for) the post mining land use to be livestock and wildlife grazing. Final reclamation activities will be completed in a manner to provide the lands able to parallel the pre-mining land use." Thus, the permittee intends to conduct all mining operations in a manner such that the post-mining land use and the pre-mining land use are identical.

Findings:

The submitted information is adequate to address the minimum regulatory requirements of this section.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

Analysis:

The Permittee states that enhancement measures will include establishment of young vegetation that may help "break up" the large blocks of sagebrush communities ("monoculture") near G2 and G3.

Findings:

The information provided is adequate for the reporting of Fish and Wildlife requirements of the Reclamation regulations.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

Upon completion of the drilling phase of the well(s), approximately 60-70% of the disturbance(s) will be reclaimed by regrading that portion to approximate original contour, (See Chapter 5, page 5-14, section **553.100 Disturbed Area Backfilling and Grading, Approximate Original Contour**) roughening the area to enhance moisture retention and re-seeding the area with the seed mix approved by the Division. See page 5-9, Chapter 5, section **537.200, Regrading of Settled and Revegetated Fills.** As indicated, "upon completion of the well site, the areas not required for the exhaust blower will be regraded to approximate original contour". If any settling should occur within the reshaped area, the permittee's submittal makes the commitment to regrade the settled areas. After the venting phase of the degasification wells has been completed, the remainder of the disturbance will be reclaimed, returning the acreage associated with venting phase to approximate original contour. This will be followed by roughening and reseeding of the area. The disturbed area perimeter fence and the associated permittee identification signs will remain in place until the Division has made a determination that all reclamation standards have been adequately addressed.

Findings:

The submitted information meets the minimum regulatory requirements of this section.

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

See previous analysis under **APPROXIMATE ORIGINAL CONTOUR RESTORATION.**

Previously Mined Areas

The area has not been mined previously; the requirements of this section are not applicable to the methane well submittal.

Backfilling and Grading On Steep Slopes

Chapter 4, page 4-1, section **411.120 Land Capability** indicates, "the well site areas are located on the flatter mesa tops and rolling terrain". A review of FIGURES 5-1, 5-5, and 5-10, which are contour maps for each of the respective well sites, reveals that, based on the determination of the slope gradient that none of the well sites surface increase in elevation at an angle steeper than 12 degrees. By definition, steep slopes are slopes that increase in height when the vertical angle is twenty degrees or more. Therefore, none of the well sites are being proposed in what would be considered a steep slope area.

Special Provisions for Steep Slope Mining

This requirement is not applicable to this submittal.

Findings:

The information submitted meets the minimum regulatory requirements of this section.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

Reclamation of the methane vent wells is addressed in Chapter 5; section **540 RECLAMATION PLAN**, section **550, RECLAMATION DESIGN CRITERIA AND PLANS**, and section **560, PERFORMANCE STANDARDS**.

Section **541.100, Commitment** indicates, "Upon permanent cessation of methane venting, Dugout Canyon Mine will seal the wells and permanently reclaim all affected areas in accordance with the R645 regulations and this reclamation plan."

The sealing of wells involves meeting the minimum regulatory requirements associated with R645-301-765. Page 7-13, **Chapter 7, HYDROLOGY**, section **748, Casing and Sealing Wells,** refers one to **Chapter 5, ENGINEERING**, section **542.700**, **Final Abandonment of Mine Openings and Disposal Areas** that states, "All openings will be sealed in accordance with Federal and State Regulations. The casings will be plugged at the bottom to hold concrete. A lean concrete mixture will be poured into the casing until the concrete is within five (5) feet of the surface. At that time, the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before the final reclamation is completed."

Methane degasification wells are unique in that they are drilled to a depth that is approximately twenty-five feet above the coal seam that is being extracted. As the longwall face retreats and extracts the coal from the area beneath the borehole, the roof caves as the longwall shields are advanced in order to protect the machinery. Hopefully, the roof caves up to the bottom of the degasification well, completing the circuit, and allowing atmosphere containing mine gases to be vented to the surface. An exhaust blower will sit on the surface creating a low pressure across the wellhead, pulling the mine gases from the underground gob area.

It is generally accepted that more than 90% of the subsidence associated with coal extraction via longwall mining methods will occur within the first year after completion of the extraction process. The casing of the methane vent well may be subjected to crushing or shearing anywhere along its length, due to the shifting, bending and/or breaking of the strata adjacent to the well. Thus, the venting of combustible gases from the gob areas of the mine may be short lived. The plugging of these casings may only be effective in preventing adverse environmental or health and safety effects to a certain extent. The prevention of cross contamination of aquifers may not be possible in consideration of the fact that the plugging of the hole may not be possible for its entire depth.

Findings:

The permittee has committed to plugging the degasification well casings to the extent possible to prevent adverse environmental damage or possible effects to health and safety. This commitment is the best that can be given at this point in time, as only the future will tell if the partial plugging of the wells will be adequate. The minimum regulatory requirements of this section have been addressed.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The reclamation timetable is shown on Figure 5-15. The first phase of reclamation will occur immediately after drilling and reduce the operational area to that area needed for the access road, fan and topsoil storage. The remaining area will be graded, topsoiled, roughened, seeded, and mulched (see Figures 5-4, 5-8, and 5-12).

The plan describes the reclamation of the drilling mud pits in Section 242.100. The mud pit will be allowed to dry; and will be filled with soil that will be compacted to minimize settling. There will be mixing of the cover material with the rock fragments and sediments of the mud pit to avoid creating an abrupt boundary between the layers.

The plan indicates that site will be ripped to a depth of eighteen to twenty-four inches (Section 242.100 and 341.200) to reduce compaction.

Topsoil will be re-spread using a trackhoe. The soils will be handled when loose and friable (not too wet, not too dry), see Section 242.100. Redistribution thickness is shown in Table 2-3.

The soils will be analyzed during soil salvage for the following parameters: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent $CaCO_3$, plant available Nitrogen, Potassium, and Phosphorus (Section 243) to determine if amendments are needed.

Findings:

The information provided meets the minimum requirements of the Reclamation Topsoil Redistribution Regulations.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

Reclamation

Chapter 5, page 5-13, section **542.600 Roads** of the methane well submittal addresses this requirement. A road length of 55 feet will be developed for well G-1. A 370-foot road will be developed for road G-2; G-3 will require a ninety-foot section of road development. **542.600** states the following; "the access roads established during the drilling program will be reclaimed after methane extraction has been completed." A reference is made to **Chapter 2**, section **242**; same is in reference to soils redistribution, which is not addressed by this section.

Retention

As mentioned elsewhere in this technical memorandum, the roads in place at the present time are the property of the heirs of the Milton and Ardith Thayn Trust. They will stay in place after the venting phase of the wells has been completed. The surface use agreement in place between Canyon Fuel Company and the Trust allows the permittee the use of the roads for the length of the agreement.

Findings:

The submitted information meets the minimum regulatory requirements of this section.

CONTEMPORANEOUS RECLAMATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General

Upon completion of the drilling phase of the well(s), approximately 60-70% of the disturbance(s) will be reclaimed by regrading that portion to approximate original contour, (See Chapter 5, page 5-14, section **553.100 Disturbed Area Backfilling and Grading, Approximate Original Contour**) roughening the area to enhance moisture retention and re-seeding the area with the seed mix approved by the Division. See page 5-9, Chapter 5, section **537.200, Regrading of Settled and Revegetated Fills.** As indicated, "upon completion of the well site, **the areas not required for the exhaust blower** will be regraded to approximate original contour". If any settling should occur within the reshaped area, the permittee's submittal makes the commitment to regrade the settled areas.

The reclamation timetable is shown on Figure 5-15.

The concept of immediately stabilizing the site is sound.

The site will be fully reclaimed upon cessation of methane venting (Section 541).

Findings:

The submitted information meets the minimum regulatory requirements.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation: General Requirements

The submittal makes the commitment to reclaim as much of the area being disturbed as possible upon completion of the drilling phase of wells G-3, G-2, and G-1. A seed mix has been included as part of Chapter 3, page 3-12, **Table 3-2, Reclamation Seed Mix.** Roughening of the area will enhance moisture retention and promote new growth.

The reclamation will occur in two phases.

1. Phase I: Contemporaneous reclamation: Apply final reclamation procedures to site-specific areas no longer needed for operations.
   - Grade.
   - Rip to 18-24".
   - Apply topsoil and leave in roughened state by gouging (*See *Findings*).
   - Hydroseed the final seed mix (slurry will include a small amount of fiber).
   - Wood fiber mulch at a rate of 2,000 pounds per acre with tackifier.
2. Phase II: Final reclamation: Apply final reclamation procedures to the remaining disturbed areas no longer needed for operations.
   - Plug the wells.
   - Prepare the site.
   - Plant as above.

The seed mix is the same for both Phase I and II. The Permittee agrees to hydroseed at a final rate of 106 pure live seed per square foot. The Permittee will seed the areas in the fall. The species and planting rates are the following:

Species		***PLS/sq.ft.***
Elymus elymoides	Bottle brush squirrel tail	4
Poa pratensis	Kentucky bluegrass	16
Elymus spicatus	Bluebunch wheatgrass	12
Poa secunda	Sandberg bluegrass	25
Bromus marginatus	Mountain brome	3
Penstemon strictus	Rocky mountain penstemon	11
Lupinus x alpestris	Mountain lupine	1
Artimesia tridentata	Wyoming big sage	29
Symphocarpus oreophilus	Mountain snowberry	5

The Division provides the following comments and recommendations for the seed mix:
Mountain brome-

- Not included in the vegetation survey.
- Consider *Bromus carinatus* (California brome; surveyed on site). When ordering seed make sure to specify the species.

The seed mix provides a vegetative cover composed of native species (Welsh considers Kentucky Bluegrass as native). The goals are to quickly stabilize the disturbed site and provide compatible browsible and forgable habitat for the postmine land use. The Permittee will fence the well sites to prevent grazing until bond release.

Revegetation: Timing

The submittal contains verbiage relative to the completion of all required reclamation activities upon the completion of topsoil replacement. (See section **354 Revegetation: Timing,** Chapter 3, page 3-13). All acreage associated with the methane vent wells will be reshaped to approximate original contour, roughened and revegetated to control erosion and promote the use of the area in accordance with the approved post mining land use. The Permittee will seed the areas in the fall.

Revegetation: Mulching and Other Soil Stabilizing Practices

Chapter 3, page 3-13, section **355 Revegetation: Mulching and Other Soil Stabilizing Practices** commits the permittee to the following, "mulch and/or soil stabilizing practices (roughening, etc.) will be used on all areas that have been regraded and covered by topsoil (Section **341.200**). Dugout Canyon Mine will exercise care to guard against erosion during and after application of topsoil".

The Permittee will apply 2000 pounds per acre of wood fiber mulch to the disturbed areas (Section 341.200). The application states the area will be left in a roughened state after ripping.

Revegetation: Standards For Success

The Permittee plans to measure success of vegetation based on extent of cover. The success standards for the reclaimed areas are the associated reference sites. The amendment states that the plan will follow the Division's guidelines for sampling techniques, statistical methods, and post-land use parameters. The Permittee plans to use the following sampling methods:

- Cover: line interception.
- Density: belt transect or plot.
- Productivity: clipping.

The Permittee will measure productivity using the clipping method. The Permittee may want to consider the following exert from the vegetation guidelines:

Exclosures:
The use of exclosures for productivity measurements is optional where domestic livestock will not be in the study area prior to sampling. If livestock are to be in the study area prior to sampling, then exclosures should be used. When used, exclosures should be large enough to prevent animals from reaching through and grazing on the plot to be sampled. Exclosures should be randomly placed and anchored to the ground, before the growing season begins. The number of exclosures established should be based on previously collected production data and field experience. To reduce variability and sample sizes, community types should be separated as much as possible. Exclosures should be numbered in the order of the random numbers generated for their placement. Sampling should follow the number sequence until sample adequacy is met or all exclosures have been sampled.

Findings:

The information submitted meets the minimum regulatory requirements.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

The area will be ripped to a depth of 18 – 24 inches (Section 242.100).

Erosion control measures will include silt fences and berms (Section 231.100), seeding, and mulching of the soils (244.200 and 341.200. Disruptive gullies (greater than nine inches) will be reseeded (244.300). Surfaces will be left rough. Mulch will be applied at 2,000 lbs/ac with a tackifier Section 341.200).

The Permittee should contemplate the addition of mulch generated from the grubbing of vegetation. This would be an inexpensive method of adding surface protection.

Findings:

The information provided is adequate for the purposes of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Affected Area Boundary Maps

The general location of the proposed wells is depicted on PLATE 1-4, which shows the permit boundary for the Dugout Canyon Mine. The proposed disturbance for each of the wells is depicted on FIGURE 1 for well G-1, FIGURE 5-5 for well G-2, and FIGURE 5-9 for well G-3. All figures are P.E. certified by a Utah registered professional engineer.

Bonded Area Map

The bonded area for each well is depicted by FIGURE 5-1 for G-1, FIGURE 5-5 for G-2 and FIGURE 5-9 for G-3.

Final Surface Configuration Maps

The permittee has committed to returning the drill pad areas to approximate original contour. Thus, the final surface configuration should very closely resemble the contours depicted on FIGURES 5-1, 5-5, and 5-9.

Certification Requirements.

All maps and drawings requiring certification as listed under R645-301-512 are P.E. certified by Mr. Layne Jensen, Utah registered professional engineer.

Findings:

The submitted information meets the minimum regulatory requirements of this section.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

General

The permittee has submitted reclamation costs for the well sites. The following reclamation cost dollar amounts were determined from the provided information:

1) G-1 at an acreage of 0.6……..$8729, including reseeding and pocking;
2) G-2 at an acreage of 1.21……$25,301, including reseeding and pocking; (Note: G-2 has a 370-foot roadway length requiring reclamation).
3) G-3 at an acreage of 0.97……$18,188, including reseeding and pocking.

Thus, the total dollar amount anticipated to reclaim the 2.78 acres associated with the three proposed well site is approximately $52,000, or $18,800 per acre. These figures include filling in the mud pit(s), back filling and grading the drill pad, plugging the well casing, spreading topsoil, pocking and reseeding, and removing the fencing upon Division approval of the reclamation. Managerial costs have also been included.

The reclamation cost figures have been reviewed by the Division and are determined to be adequate.

Findings:

The minimum regulatory requirements of R645-301-800, Et. Seq., have been met.